

## NEW SPECIES OF INDIAN HYMENOPTERA.

## APIDÆ.

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In the following paper I have followed the generic nomenclature of Schmiedeknecht and Friese in their *Apidæ Europæ*. This in some instances differs from that adopted by Bingham in his Vol. I, Hymenoptera, of the Fauna of India Series. To follow the latter would doubtless have been more convenient for those who devote their attention to the Indian fauna only, but as the generic nomenclature of the former authors seems to be in accordance with the generally accepted rules, I thought it best to follow in their footsteps, more especially as this nomenclature seems to have been followed by most European Hymenopterists since the publication of their work.

My collecting during the past two summers has been entirely confined to the neighbourhood of Quetta and Peshin. As the fauna of Baluchistan is chiefly palearctic in character, and is closely allied to that of Central Asia and Eastern Europe, many of the species I obtained have been described by Morawitz, Fedtschenko and others. With a view to making the list of species which have occurred within British Indian limits as complete as possible, I have included below all the species which I have obtained which have not been previously recorded from India, whether entirely new species, or additions to the fauna of British India.

## ANDRENA.

This genus is well represented in Baluchistan, and the majority of the species obtained appear to be new. In addition to those described below, I obtained, either from Kashmir or Baluchistan, the following European species:—

*A. cineraria* (Linn.); fairly common in Kashmir.

*A. pilipes* (Fabr.); very common at all elevations in Kashmir.

*A. spinigera* (Kirby); common at Quetta in the spring at fruit tree blossoms.

*A. convexiuscula* (Kirby); common both in Kashmir and Baluchistan.

*A. tenuis* (Mor.); Peshin; apparently not common.

*A. parvula* (Kirby); common in Baluchistan in the spring.

Also specimens which I identify doubtfully as the following :—

*A. nigriceps* (Kirby) ; Baluchistan.

*A. minutula* (Kirby) ; Baluchistan.

(a) *Abdomen more or less red.*

ADRENA UNITA, n. sp.

♀ The pubescence, though somewhat sparse, hides the sculpturing of the head and thorax ; median segment very finely rugose, with no enclosed space ; abdomen minutely aciculate ; lamina at base of labrum short, transverse at apex ; second joint of antennæ longer than the two following united, vertex much narrowed and very convex ; median segment short, narrowed and rounded posteriorly ; abdomen as long as head and thorax united, narrowed at base and apex. Head and thorax black, apical two-thirds of flagellum red below ; legs black, the apical 3 or 4 joints of all the tarsi rufo-testaceous, calcaria pale testaceous ; abdomen pale red, shining, two very small lateral dark spots on 2nd segment, the first three segments almost entirely without pubescence ; pubescence, including scopa and anal fimbria, greyish white, the anal fimbria with a slightly pale fulvous tinge above ; wings clear hyaline, nervures and tegulæ pale testaceous.

*Long.* 8 mm.

*Habitat*—Peshin ; a single specimen.

This species may be at once distinguished by its abdomen being, with the exception of two small dark spots on the sides of 2nd segment, entirely pale red.

ANDRENA BALUCHA, n. sp.

♀ Head and mesonotum closely and finely, but somewhat shallowly, punctured, scutellum more sparsely, median segment very closely and finely, punctured, with a large triangular space at base somewhat coarsely rugose ; abdomen very finely, closely and shallowly punctured ; clypeus arched anteriorly, labrum at base with a small, bare, projecting lamina, narrowed towards apex, its anterior margin almost transverse. Black ; the 1st, 2nd, 3rd, and sometimes the lateral margins of the 4th abdominal segments, the anterior tibiæ below and at apex, the posterior tibiæ, calcaria, and all the tarsi pale red ; pubescence on head greyish and thick, on the thorax fulvous and short, but longer and finer, with a greyish tinge, on the sides of the median segment ; 1st abdominal segment with long, fine, greyish pubescence, and traces of a greyish

apical band, 2nd to 4th segments with bands of greyish pubescence, anal fimbria with a golden tinge; pubescence on legs, and floccus greyish, inclining to fulvous or golden on the tibiæ and tarsi, especially on the inside of the latter; abdomen below almost bare, with some longish pubescence on the apical margins of segments; wings hyaline, very slightly and narrowly infuscated at apex; nervures and stigma testaceous, tegulæ dark testaceous; the 1st recurrent nervure is received into the 2nd cubital cell past its middle.

♂ Similar, slighter, the pubescence on clypeus and front usually with a fulvous tinge, antennæ with the 2nd and 3rd joints of the flagellum subequal; the basal abdominal segment is usually more or less black, and the amount of red on the 3rd segment varies considerably in different specimens; the infuscation of the wings at apex is less than in the ♀.

*Long.* ♀ 11—13 mm. ♂ 8—10 mm.

*Habitat*—Quetta; common, especially in lucerne fields.

Of the Indian species this is most nearly allied to *A. mollis*, but is larger and more pubescent. Of the European species it appears to be nearest to *A. alpina* (Mor.), but may be distinguished from that species by the 1st recurrent nervure being received distinctly beyond the middle of the 2nd cubital cell.

#### ANDRENA PESHINICA, n. sp.

♀ ♂ Head and thorax finely and closely, abdomen minutely and very closely, punctured; lamina at base of labrum short, broad, transverse at apex; the pubescence almost entirely hides the sculpturing of the head and thorax. Black; 1st and 2nd abdominal segments (sometimes only the base of the latter) both above and below dark red; claws and calcaria rufo-testaceous; pubescence thick and white, forming broad bands on abdominal segments 1—4, scopa and anal fimbria white, the pubescence on the tarsi slightly inclining to flavous in some lights; wings hyaline, their apices very lightly infuscated; nervures and tegulæ dark testaceous.

*Long.* ♀ 10—11 mm. ♂ 8—9 mm.

*Habitat*—Peshin; Quetta; fairly common.

Not very near to any other Indian species, but allied to *A. eversmanni* (Rad.). It differs in having the 1st and 2nd abdominal segments in both sexes red; the nervures also are dark testaceous, not black.

## ANDRENA NIVEO-BARBATA, n. sp.

♂ Clypeus shallowly punctured, front above bases of antennæ very finely longitudinally striate, thorax opaque, apparently impunctate, minutely rugose, no enclosed space at base of median segment; abdomen impunctate, shining; head much wider than thorax, mandibles rather short, blunt at apex, with no visible tooth, 2nd joint of flagellum of antennæ longer than the next two united; median segment short, rounded posteriorly, abdomen shorter than the head and thorax united, very convex, the apical segment deeply incised. Black; clypeus bright yellow; apex of 1st, and the whole of 2nd, 3rd, and 4th segments dark red; apical 2 or 3 joints of the anterior tarsi, and the apical joint of the intermediate and posterior tarsi, rufo-testaceous, calcaria pale testaceous; anterior margin of clypeus with a long fringe of snow-white pubescence, remainder of pubescence griseous, except on the inside of posterior metatarsi, where it has a pale golden tinge; abdomen almost bare, except on the apical two segments; wings hyaline, nervures and tegulæ testaceous.

*Long.* 6 mm.

*Habitat*—Quetta; a single specimen taken at fruit tree blossoms in March.

Nearest to *A. cetti* (Schrank), but smaller, has no dark spots on clypeus, and wings are hyaline, not infuscated.

## ANDRENA CARA, n. sp.

♀ Clypeus minutely and shallowly, but somewhat sparsely, punctured, mesonotum and scutellum shining and impunctate, median segment opaque, impunctate, without a basal area; abdomen minutely aciculate longer than the head and thorax united. Black; the apex of the 1st, the whole of the 2nd and 3rd, and sometimes the base of the 4th abdominal segments light red, both above and below; apical 3 or 4 joints of tarsi rufo-testaceous, calcaria pale; pubescence greyish white, long on head and thorax, and forming somewhat narrow apical bands on abdominal segments 2—4; scopa and anal fimbria greyish white; wings clear hyaline, nervures, tegulæ and stigma pale testaceous; stigma very large; the 1st recurrent nervure is received into the 2nd cubital cell just beyond the middle.

*Long.* 7—7.5 mm.

*Habitat*—Peshin; fairly common.

Nearest to *A. mollis*, but smaller, the legs black, not pale honey yellow.

## ANDRENA HERA, n. sp.

♀ Head and thorax with the sculpturing almost hidden by the pubescence, through which the clypeus, vertex and mesonotum appear to be somewhat closely punctured; enclosed space at the base of median segment large, coarsely rugose; abdomen very minutely and closely punctured; lamina at base of labrum rather short, truncate at apex; 2nd joint of flagellum longer than the two following united; abdomen with the apical margins of segments 2—4 broadly depressed. Black; flagellum of antennæ rufo-testaceous; 1st and greater portion of 2nd abdominal segments pale red; apical 3 or 4 joints of all the tarsi rufo-testaceous, calcaria pale testaceous, those on the posterior tibiæ long and much curved; pubescence on vertex inclining to fulvous, on mesonotum, scutellum and postscutellum short, pale fulvous, on inside of tarsi pale fulvous-golden, anal fimbria black, with some fuscous or fuscous-white hairs laterally; remainder of pubescence, including scopa, greyish white, and forming broad bands on the apical depressed margins of segments 2—4, where it is short; wings clear hyaline, nervures and tegulæ testaceous.

*Long.* 10 mm.

*Habitat*—Quetta; a single specimen.

This species is allied to *A. peshinica* described above, but is larger, the anal fimbria is black, not white, and the wings are not infuscated at apex. It also appears to be near to *A. transitoria* (Mor.), but from this species it may be distinguished by the clear hyaline wings, as well as by the white pubescence on the front.

(b) *Abdomen reddish brown.*

## ANDRENA FLAVO-FACIES, n. sp.

♀ Head and thorax with the sculpturing hidden for the most part by the pubescence, abdomen very minutely and closely punctured; head slightly broader than thorax, clypeus rounded anteriorly, the lamina at base of labrum short and inconspicuous, but somewhat broad; abdomen longer than head and thorax united. Head and thorax black, abdomen reddish brown; the mandibles at base, clypeus, and sides of front pale yellow; the labrum, mandibles in the middle, antennæ, and the basal and apical margins of segments 1—4 rufo-testaceous; the posterior tibiæ, all the tarsi, and the calcaria pale testaceous; pubescence greyish, on the mesonotum short with a greenish tinge, and

forming apical bands on segments 2—4, with a trace of a band on apical margin of 1st segment ; scopa and anal fimbria grey ; wings hyaline, nervures and tegulæ testaceous.

♂ Only distinguishable from the same sex of *A. bi-emarginata*, described below, by the mandibles being yellow at base, and red in the middle, instead of wholly black.

*Long.* ♀ 7-8 mm. ♂ 6-7 mm.

*Habitat*—Quetta ; Peshin ; four specimens.

This species is, I believe, the only one hitherto described in which the ♀ has the clypeus and front yellow.

(c) *Abdomen entirely black.*

ANDRENA MARMORA, n. sp.

♀ Head and thorax very closely and finely punctured under the pubescence, which usually hides the sculpturing, triangular space at base of median segment finely rugose, abdomen minutely, closely, and shallowly punctured, except the apices of the segments, which are depressed and impunctate ; eyes reaching the base of the mandibles, the latter dentate at apex, the tooth small. Black ; the calcaria and claws rufo-testaceous ; pubescence as follows : on head and thorax above greyish white, snow-white on front and sides of median segment, a black band across the thorax between the tegulæ ; abdomen smooth and shining, without pubescence above, but with lateral spots of snow-white pubescence on segments 1—4, the spot on 1st segment small ; 5th segment with long, silky white pubescence, below which the anal fimbria is black ; head, thorax and abdomen below with black pubescence, except some greyish white hairs below the eyes, and sparse greyish apical bands on the apical one or two segments ; legs with entirely black pubescence, except the femora of the anterior and intermediate legs, where it is long, silky and white ; forewing with the basal half hyaline, apical half fuscous, with some lighter patches ; hindwing hyaline, its extreme apex infuscated ; nervures and tegulæ blackish.

*Long.* 12-13 mm.

*Habitat*—Quetta ; Peshin ; not uncommon, but I did not secure a male.

This species seems to be nearest to *A. fusco-calcarata* (Mor.) from the Caucasus, of which only the ♂ is known. It differs, however, in several respects from the description of that species, of which I scarcely think it is the other sex.

## ANDRENA DOLOROSA, n. sp.

♀ Head closely, but not very finely, mesonotum and scutellum sparsely, but deeply, punctured; median segment with the sides very finely, the triangular space at base very coarsely, rugose; abdomen almost impunctate, a few very fine and shallow punctures at the bases of segments; mandibles dentate, the tooth small, lamina at base of labrum small, rounded at apex; mesonotum with a conspicuous median longitudinal impressed line; apical margins of abdominal segments 2—4 depressed. Black, the claws rufo-testaceous; pubescence black, except on the front, where it is sparse and greyish, on the anterior tarsi, where it is greyish fuscous, on the scape below and on the posterior femora, where it is long and white; abdomen shining, without pubescent bands, anal fimbria entirely black; calcaria of posterior legs much curved; wings fuscous, with a few somewhat lighter patches on the disc; nervures and tegulæ black.

*Long.* 11-12 mm.

*Habitat*—Peshin; two specimens.

This species belongs to the group of *A. pilipes* (Fabr.) but can be distinguished by its fuscous wings and almost entirely black pubescence.

## ANDRENA COLLATA, n. sp.

♂ Finely, but somewhat shallowly and not very closely, punctured, including the abdomen; head slightly wider than thorax, lamina at base of labrum small, emarginate at apex; antennæ long, reaching nearly to the apex of thorax, 2nd joint of flagellum much shorter than 3rd; an impressed line on mesonotum; enclosed space at base of median segment large, triangular, finely rugose, but its margin not very clearly defined; abdomen shorter than the head and thorax united, all the segments more or less constricted. Black; the apical two or three tarsal joints more or less testaceous, calcaria pale; pubescence grey, somewhat sparse and short, abdominal segments without pubescent bands, but more or less ciliated; wings clear hyaline, tegulæ blackish, nervures and stigma very pale testaceous; the 2nd cubital cell receives the 1st recurrent nervure distinctly past the middle.

*Long.* 5.5 mm.

*Habitat*—Quetta; three specimens.

Nearest to *A. nana* (Kirby), but smaller, and may be distinguished by the nervures and stigma being very pale testaceous, and by the 2nd cubital cell receiving the 1st recurrent nervure past the middle.

## ANDRENA LEGATA, n. sp.

♀ Very finely aciculate, the front, including the clypeus, very finely longitudinally striate; mesonotum with sparse shallow punctures, enclosed space at base of median segment large, triangular, depressed, finely rugose; lamina at base of labrum small, slightly incised at apex; median segment narrowed posteriorly; abdomen slightly shorter than head and thorax united, the 2nd, 3rd and 4th segments narrowly, but deeply, excavate at their bases. Black; somewhat opaque, except the abdomen, which is slightly shining; flagellum of antennæ towards apex below, and the whole of the tarsi rufo-testaceous, calcaria pale testaceous, apical margins of abdominal segments very slightly inclining to testaceous; pubescence sparse, greyish, inclining to flavous on clypeus, tarsi and anal fimbria; no pubescent bands on abdominal segments, which are scarcely even ciliated; wings fuscous, stigma dark testaceous, nervures and tegulæ testaceous.

♂ Similar, clypeus yellow with two small dark spots; flagellum of antennæ piceous, 2nd and 3rd joints subequal; abdomen as long as head and thorax united, 2nd to 4th segments not or scarcely excavate at base, but their apical halves slightly depressed; wings almost clear hyaline.

*Long.* 6-7 mm.

*Habitat*—Peshin; four specimens.

Nearest to *A. tenuis* (Mor.), but slightly larger. The ♀ can be distinguished by the fuscous wings, and by the 2nd to 4th segments being excavate at base; the ♂ by the 2nd joint of flagellum being about the same length as the 3rd, instead of equal to the 3rd and 4th united.

## ANDRENA BI-EMARGINATA, n. sp.

♀ Sculpturing for the most part hidden by the pubescence, but where it can be distinguished closely and finely punctured; lamina at base of labrum bi-emarginate, almost tridentate, antennæ with the 2nd joint of the flagellum as long as the two following; space at base of median segment almost smooth, opaque. Black; the flagellum below reddish, all the tarsi and sometimes part of the intermediate and posterior tibiæ more or less rufo-testaceous, calcaria pale testaceous; pubescence greyish, except on the vertex, pronotum, mesonotum, scutellum and postscutellum, where it is pale fulvous; scopa and anal fimbria grey; abdomen almost entirely covered by pubescence, which is thickest and



forms somewhat broad bands on the apical margins of segments ; wings clear hyaline, tegulæ shining testaceous, nervures testaceous, stigma paler.

♂ Similar, smaller, apices of abdominal segments depressed ; the whole of the pubescence grey, but not so dense ; clypeus and a large spot on each side of it, reaching the inner orbits of the eyes, pale yellowish ; antennæ below paler red, tarsi pale testaceous ; the apices of the abdominal segments narrowly testaceous, but this is frequently not apparent owing to the pubescence.

Long. ♀ 7-8 mm. ♂ 6-7 mm.

Habitat—Peshin ; common in April.

I cannot find that the ♀ is very near to any other species. The ♂ is allied to *A. satellita*, described below, but may be distinguished from it by the flagellum being pale red below, not piceous. It may be distinguished from the same sex of *A. flavo-facies* by the mandibles being wholly black.

#### ANDRENA FLAGELLA, n. sp.

♀ Clypeus minutely aciculate, with a few very shallow punctures ; head and thorax minutely punctured, the enclosed space at base of median segment narrow, with fine lateral striæ at base ; abdomen minutely and closely punctured ; lamina at base of labrum broadly rounded at apex, a small tubercle near the base of mandibles ; antennæ with the scape very long and narrow, 2nd joint of flagellum as long as the three following, very narrow at base, gradually widening towards apex ; a carina from between bases of antennæ to anterior ocellus ; sides of front along inner orbits of eyes depressed, with fine depressed pubescence, this being particularly noticeable from above, vertex sharply narrowed above, and very convex ; abdomen scarcely as long as head and thorax united, its apical segment incised. Black ; the flagellum rufo-piceous, calcaria testaceous, claws rufescent ; pubescence greyish-white, clypeus in type specimen without pubescence, probably owing to abrasion, mesonotum with sparse pubescence ; on the sides of the median segment it is long, silky and snow-white ; on the apical margins of abdominal segments 1-4 it forms somewhat broad, uninterrupted, snow-white bands ; anal fimbria brownish on 5th, black on 6th, segment ; pubescence on legs and scopa short and greyish-white, except on the tarsi, where it has a pale golden tinge, especially on the inside ; wings hyaline, nervures and tegulæ testaceous.

*Long.* 9 mm.

*Habitat*—Quetta ; a single specimen.

Comes nearest to *A. opaca* (Mor.), but may easily be distinguished from it by the hyaline wings, and the long 2nd joint of flagellum of antennæ.

(d) *Abdomen black, the margins of the segments more or less testaceous.*

ANDRENA HALICTOIDES, n. sp.

♂ Slenderly built, minutely aciculate, front below antennæ very finely longitudinally striate, no enclosed space at base of median segment ; head nearly twice as wide as thorax, lamina at base of labrum hidden by the very long silky pubescence of the clypeus ; 2nd joint of flagellum of antennæ longer than, but not twice as long as, the 3rd joint ; cheeks strongly developed, with a large, bluntly pointed tubercle ; thorax short, median segment small and narrow ; abdomen long and slender, shaped like that of the same sex of *Halictus*. Black ; flagellum of antennæ rufopiceous, the margins of the abdominal segments narrowly, and the apical 2 or 3 joints of the tarsi, testaceous, calcaria pale ; pubescence greyish white, very long, thick, and silky on clypeus and front, moderately long and thick on thorax and legs, sparse, with no bands, and very slight cilia on abdomen ; wings clear hyaline, tegulæ dark, nervures rather pale testaceous.

*Long.* 6-7 mm.

*Habitat*—Peshin ; seven specimens.

Easily distinguished from any species near it in size by the large tubercle on the cheeks. It has superficially the appearance of an *Halictus*, but the clypeus and face are not elongate, and the basal nervure is not sharply angled as in that genus.

ANDRENA SATELLITA, n. sp.

♂ Head and thorax closely and finely punctured, but the sculpturing obscured by the pubescence ; the space at base of median segment ill-defined, minutely rugose ; abdomen minutely, but not very distinctly, punctured ; mandibles of moderate length, slender ; 2nd joint of flagellum of antennæ equal in length to the 3rd and 4th united, the 3rd joint nearly twice as broad as long ; median segment rounded and narrowed posteriorly ; abdomen very convex, shorter than the head and thorax united. Black ; the clypeus and a spot on each side of it, reaching the

inner orbits of the eyes, pale yellow; antennæ piceous, sometimes rufo-piceous; apical margins of abdominal segments narrowly rufo-testaceous; apical two or three tarsal joints pale rufo-testaceous, calcaria pale whitish; pubescence grey, long on head and thorax, somewhat sparse on abdomen above, and forming sparsely ciliated apical bands, more or less interrupted, on segments 2-4; wings clear hyaline, tegulæ testaceous, nervures pale testaceous.

*Long.* 7-8 mm.

*Habitat*—Peshin; not uncommon.

This species is nearest to *A. erythrocnemis* (Mor.) from Russia, but may be distinguished from it by the posterior tibiæ and mandibles being entirely black.

#### MELANAPIS RUFIFRONS, n. sp.

♀ Head and mesonotum closely and finely, scutellum more sparsely, punctured, median segment finely rugose, with a triangular area at base less finely so; at the extreme base of this area there is a smaller depressed triangular space, produced into a median longitudinal furrow; abdomen microscopically aciculate, shining; clypeus roundly incised, a somewhat long, but not very broad, lamina at base of labrum very slightly incised at apex; front with a small carina between bases of antennæ; 2nd joint of flagellum longer than the two following united; an impressed longitudinal line on basal half of mesonotum, and two short impressed lines parallel with the tegulæ; abdomen as long as head and thorax united, the apices of the segments very slightly depressed. Dark red, the head less dark than the thorax and abdomen, which are more or less variegated with black; legs black, variegated with red, calcaria and apical two or three tarsal joints rufo-testaceous; pubescence on head and anterior tarsi rufous, on thorax, legs and abdomen black, sparse on the thorax, dense on the legs, abdomen bare except the anal fimbria; wings deep, shining fuscous, nervures piceous, tegulæ red.

♂ Similar, less stoutly built, head much wider than thorax, 2nd joint of flagellum about as long as the two following, pubescence on head darker rufous, head and thorax darker red, abdomen almost entirely black.

*Long.* ♀ 15-16 mm. ♂ 13-14 mm.

*Habitat*—Quetta; five specimens.

This genus was first described by Mr. Cameron from specimens obtained by me at Ferozepore, which he named *M. violaceipennis*. I have since obtained the same species both in Kashmir and Baluchistan. The present species is easily distinguished from *M. violaceipennis* by being chiefly red, not black. *Melanapis* is in many respects very close to *Andrena*, though at first sight it differs greatly from most species of that genus. In my opinion the two genera are barely separable.

NOMLA BAHADUR, n. sp.

♀ Clypeus finely longitudinally rugose, the sculpture of the remainder of head more or less hidden by the pubescence; mesonotum and scutellum closely and finely punctured, median segment finely rugose, with a very narrow space at its base longitudinally striate; abdomen almost impunctate, the 1st and 2nd segments only with a few shallow punctures; clypeus sub-parallel, transverse anteriorly, its margin upturned, and with a median longitudinal carina; mesonotum with three parallel impressed lines from the base, not reaching its apex, and two shorter impressed lines parallel with the tegulæ; scutellum large and prominent, more finely and closely punctured in the centre than towards the sides, its posterior lateral angles produced into blunt teeth; it is produced posteriorly into a kind of plate, which is concave above, its apex deeply triangularly incised, and thus resembling the scutellum of the genus *Crocisa*; median segment vertical, almost hidden by the scutellum; apical margins of abdominal segments depressed; calcaria of intermediate tibiæ with three or four spines on each side; outer calcar of posterior tibiæ long and upcurved, inner calcar pectinated. Black; flagellum of antennæ dark, rufous below; apical joints of tibiæ more or less rufo-testaceous; apical margins of abdominal segments 1—4 with pale blueish green interrupted non-pubescent bands, the interruptions becoming successively narrower on each segment towards apex; calcaria dark rufo-testaceous; pubescence on head and thorax greyish white, and sparse, longer on the sides of median segment; on the abdomen there is a little greyish pubescence on the lateral margins of segments; anal fimbria and pubescence on ventral segments dark fulvous, mixed with some fuscous hairs; pubescence on legs short, greyish outside, dark fulvous inside; wings hyaline at base, the apical half infuscated, nervures and tegulæ rufo-pecious; the 2nd cubital cell receives the 1st recurrent nervure near its outer angle.

♂ Sculpturing of head entirely hidden by the pubescence; mesonotum and scutellum closely and rugosely punctured; abdomen with the basal two segments more distinctly punctured at base than in the ♀; calcar of intermediate tibiæ short, not spined; posterior femora enormously incrassated, posterior tibiæ short, much widened at apex, and produced both above and below, their width at apex being nearly equal to their length. Black; antennæ piceous; apical plate of scutellum rufo-testaceous; abdomen with non-pubescent interrupted bands, similar to those of the ♀, on segments 1—5; pubescence on head and mesonotum thick, short and fulvous, on median segment and 1st abdominal segment griseous; a little more griseous or pale fulvous pubescence on the abdomen than in the ♀; anal fimbria black; pubescence on legs grey, very short, longer and pale golden on inside of posterior tarsi; wings light flavo-hyaline, their apices infuscated, nervures and tegulæ dark rufo-testaceous.

*Long.* 13—15 mm.

*Habitat*—Deesa; not uncommon, but very local.

This species would come into Bingham's key under a new sub-division of "A", "all the fasciæ interrupted."

NOMIA KANGRÆ, n. sp.

♀ The pubescence hides the sculpturing on the clypeus and front, postscutellum, and sides of the median segment; vertex closely and deeply punctured, mesonotum and scutellum more finely and closely punctured, bases of abdominal segments very deeply and distinctly punctured, the punctures being fine and close at the bases, larger and less close in the middle of segments, apices of segments, under the pubescence, depressed and impunctate; pronotum with a notch in the centre anteriorly, enclosed space at base of median segment rather small, longitudinally striate or rugose. Black; 2nd and 3rd joints of flagellum of antennæ red below, all the tibiæ and tarsi more or less rufo-testaceous, apices of abdominal segments under the pubescence testaceous; pubescence pale golden, very dense on the clypeus and front, less dense on the thorax, and forming dense, moderately broad apical bands on the margins of segments 1—5; anal fimbria and pubescence on legs of the same colour as the rest of the pubescence; wings flavo hyaline, their apices infuscated, nervures and tegulæ pale rufo-testaceous, the 1st recurrent nervure is received into the 2nd cubital cell past its middle,

*Long.* 8 mm.

*Habitat*—Kangra Valley, 4,500ft.; two specimens received from Mr. G. C. Dudgeon.

Nearest to *N. aurifrons* (Smith) and *aurobalteata* (Cam.), from both of which it may be distinguished by the abdomen being punctured, except at the apices of the segments.

PASITES MACULATUS (Jur.).

I obtained at Quetta a specimen of this genus, which I identify with some doubt as this species.

EPEOLUS PICTUS (Nyl.).

One specimen of an *Epeolus*, which, I think, is this species, was obtained by me at Quetta.

AMMOBATES SOLITARIUS, n. sp.

♀ Head, including the labrum, and thorax very closely and finely, abdomen still more minutely, punctured, but the whole of the sculpturing more or less obscured by the pubescence; labrum very long, rounded at apex; maxillary palpi 6-jointed, the basal and apical joints the longest, sub-equal in length, the apical joint very narrow; antennæ reaching to the scutellum, which is prominent, almost bi-tuberculate, having a median depression; postscutellum semicircular, rather large; median segment almost vertical; abdomen nearly as long as the head and thorax united, apical segment minutely rugose, wide, almost truncate at apex. Head and thorax black; antennæ rufo-piceous; labrum, abdomen, the greater part of the femora and the whole of the tibiæ and tarsi rather light red, except the claws, which are long and blackish; pubescence grey, short, thick on head and thorax, and forming wide bands on apical margins of segments 1—5; wings hyaline, nervures piceous, tegulæ red.

♂ Similar, but abdomen and legs somewhat darker red, apical abdominal segment broadly incised.

*Long.* 6-7 mm.

*Habitat*—Quetta; two specimens of each sex.

This genus is new to India. The present species is nearest to *A. armeniacus* (Mor.), but may be distinguished by the clear hyaline wings, and by the first three abdominal segments being pubescent at apex, not smooth and bare.

CTENOAPIS LUTEA (Cam.).

In the Annals and Magazine of Natural History for August, 1901, Mr. Cameron described two species of a new genus from specimens

obtained by me at Ferozepore. I had then only a few specimens, but the same insects are common at Quetta, and I find that they must be united as ♀ and ♂ of one species. I have seen them in coitu, and have obtained a considerable number of both forms; all those of the lutea form were females, and all those of the flavomaculata form were males. The ♂ is invariably the larger and more stoutly made insect. The maxillary palpi are 6-jointed, the basal joint the broadest, 2nd the longest, remainder sub-equal. The labial palpi are 4-jointed, the basal joint about one-third longer than the 2nd, apical two joints small, sub-equal. The antennæ of the ♀ are 12-jointed, those of the ♂ 13-jointed. The ♂ has only one calcar on the posterior tibiæ, the ♀ having two. In both sexes the tarsal claws have a large but blunt subapical tooth, and a somewhat large pulvillus.

NOMADA DETECTA, n. sp.

♀ Head and thorax finely rugose, granular, abdomen minutely aciculate; clypeus produced, its anterior margin rounded; a short carina between bases of antennæ; scutellum with a median depression, causing it to appear almost bi-tuberculate; postscutellum and median segment very steeply sloped, the enclosed space at the base of the latter almost smooth; 2nd abdominal segment the broadest. Dark red, the mandibles at base, the labrum, clypeus and front as high as the base of antennæ, scape of the latter, pronotum, tubercles and the greater part of the thorax laterally and below, scutellum, postscutellum, the median segment except in the centre, transverse bands on segments 1, 4 and 5, lateral spots on segments 2 and 3, and the tibiæ and tarsi more or less yellow; the amount of yellow, especially on the abdomen, varies greatly, and some specimens are almost entirely red; tarsi and apical abdominal segment with a little pale golden pubescence, remainder almost bare; wings hyaline, very slightly infuscated along their apical margins; nervures testaceous, tegulæ yellow.

♂ Sculpturing similar to that of the ♀, but the enclosed space at the base of median segment is finely rugose, not smooth; apical abdominal segment incised, 2nd joint of flagellum of antennæ distinctly longer than 3rd. Black; the mandibles, labrum, clypeus and front as high as the base of antennæ, scape of the latter, pronotum, tubercles and the greater part of the thorax laterally and below, scutellum, postscutellum, large round sublateral spots on median segment, wide bands on all the abdominal segments (those on segments 2 and 3 slightly

interrupted), and the greater part of the legs bright yellow; flagellum of antennæ black above, ferruginous below; posterior femora black at base; clypeus and front with silvery, cheeks, thorax below, abdomen at apex, and legs with sparse greyish pubescence; wings hyaline, with slight indications of infuscation at apical margin, nervures testaceous, tegulæ yellow.

*Long.* 8-9 mm.

*Habitat*—Quetta; Peshin; fairly common.

NOMADA ANNEXA, n. sp.

♀ Head and thorax closely and deeply punctured, abdomen impunctate; clypeus sub-porrect, its apex almost transverse; a carina between bases of antennæ, 2nd and 3rd joints of flagellum subequal; scutellum bi-lobed, prominent; median segment with an enclosed triangular space finely rugose. Dark-red; the antennæ above, mesonotum and the greater part of the median segment black; abdomen lighter red, shining, with lateral yellow spots on 2nd and 3rd segments, the spots on the latter being very small, the segments at base inclining to black; scarcely any pubescence, except on the apical abdominal segment, where it is greyish fuscous; wings subhyaline, slightly infuscated at apex; tegulæ red, nervures piceous; only two cubital cells, the 2nd being formed from what is usually the 2nd and 3rd, though there is no sign of a transverse cubital nervure between them.

*Long.* 5 mm.

*Habitat*—Kashmir; two specimens obtained between 5,000 and 6,000 feet.

This species, which agrees in every other respect with the genus *Nomada*, can be easily recognised by having only two cubital cells. As I obtained two specimens exactly similar at the same place it can, I think, scarcely be considered an occasional "sport," though I believe that this genus has not previously been obtained with only two cubital cells.

I obtained at Quetta also the following species of *Nomada*, which have not previously been recorded from Indian limits:—

*N. coxalis* (Mor.).

*N. distinguenda* (Mor.).

*N. furra* (Panzer).

*N. mutica* (Mor.).



## SYSTROPHA PLANIDENS (Giraud).

Three specimens ; Quetta.

## OSMIA SPONSA, n. sp.

♀ Closely and finely punctured, median segment minutely rugose, with no enclosed space ; mandibles with two longitudinal carinæ, bidentate, the inner tooth broad, blunt, almost bifid ; clypeus with its anterior margin transverse ; 1st and 2nd joints of flagellum of antennæ subequal, 3rd and 4th also subequal, shorter than 1st and 2nd ; scutellum prominent, level with the mesonotum ; median segment short, rounded, almost vertical ; abdomen nearly cylindrical, convex, shorter than head and thorax united. Dark blue, abdomen brighter blue, shining ; clypeus blueish black, antennæ piceous, legs, including calcaria, black ; pubescence greyish white, somewhat sparse, forming entire narrow subapical bands on abdominal segments 1—5 ; scopa white ; pubescence on inside of posterior tarsi black ; wings hyaline, very slightly infuscated at apex, nervures and tegulæ piceous.

♂ Similar ; no pubescent bands on abdomen ; front with long greyish pubescence ; wings clear hyaline, very slightly infuscated in radial cell.

Long. ♀ 7·8 mm. ♂ 5·5 mm.

*Habitat*—Quetta ; not uncommon, but I only obtained one ♂, which may be an unusually small specimen.

Much smaller than *O. adæ*, which has no pubescent bands on the abdomen. Nearer to the European *O. gallarum* (Spin.), but clypeus not emarginate, abdominal fasciæ 1—3 not interrupted, and wings only slightly infuscated.

## OSMIA BALUCHA, n. sp.

♀ Head and thorax closely and finely, abdomen more minutely, but very closely, punctured ; lower margin of eyes not reaching the base of the mandibles, and the portion of the face between them enlarged and subtuberculate on the outer side ; clypeus with a median longitudinal carina, its anterior margin produced, sub-parallel, deeply triangularly emarginate, leaving two triangular sub-parallel laminae ; remainder of head, thorax and abdomen with the sculpturing to a considerable extent hidden by the pubescence. Aeneous green, the head and thorax somewhat darker than the abdomen ; all the calcaria, and sometimes the apical two or three joints of the tarsi, rufo-testaceous ; pubescence grey, mixed with a few black hairs ; abdomen with ciliated bands of fulvous

pubescence, along the apical margins of segments 1—5 ; pubescence on the inside of posterior tarsi and scopa fulvous ; wings hyaline, nervures black, tegulæ dark testaceous ; 2nd cubital cell considerably larger than the 1st.

♂ Similar, smaller ; clypeus transverse at apex, not porrect ; antennæ reaching beyond the scutellum ; apical abdominal segments not dentate.

*Long.* ♀ 12-13 mm. ♂ 8-10 mm.

*Habitat*—Quetta ; fairly common in March.

I bred both sexes from a mud nest similar to that made by *Eumenes*, which I procured from a rafter in the roof of a stable.

This species belongs to the subgenus *Ceratostmia* (Thoms.).

#### OSMIA SITA, n. sp.

♀ Head and thorax closely punctured, granular, abdomen shining, more finely punctured, the punctures being closest along the margins of the segments ; head large, the cheeks wider than the eyes ; mandibles large, tridentate ; clypeus rounded at apex, not serrate ; abdomen very convex, slightly longer than thorax. Black, the pubescence greyish white, moderately thick ; abdomen with lateral patches of white pubescence on apical margins of segments 1—5 ; scopa white, long and thick ; tarsal claws rufous, calcaria black ; pubescence on inside of posterior tarsi fuscous ; wings hyaline, the radial cell and outer margin fuscous, nervures and tegulæ black.

♂ Smaller, pubescence longer and thicker, but the lateral marks on apical margins of abdominal segments less well defined ; segments 3—5 ciliated with greyish hairs ; apical abdominal segment serrate, emarginate at apex, with a blunt tooth on either side ; wings subhyaline.

*Long.* ♀ 10 mm. ♂ 8 mm.

*Habitat*—Quetta ; not uncommon in May.

Quite distinct from any other Indian species. Belongs to the subgenus *Acanthostmia* (Thoms.).

#### MEGACHILE.

I obtained in Baluchistan specimens of the following species of this genus :—

*M. asiatica* (Mor.) ; common.

*M. apicalis* (Spin.).

*M. rotundata* (Fabr.).

*M. desertorum* (Mor.) ; one specimen from Peshin.

*M. muraria* (Retz.) ; fairly common.

## ANTHIDIUM SALTATOR (Nurse).

I should add to the description of the ♂, which I published in the Journal of the Asiatic Society of Bengal, Vol. LXX, Part II, p. 152, that the teeth on the apical segment are as follows: two lateral, short but fairly sharp, and two apical, which are very blunt, with a space between them equal to their width. The apical teeth project much beyond the lateral ones.

## ANTHIDIUM FLORNTINUM (Fabr.) var. CAUCASICUM (Rad.).

This species or variety is common in the lucerne fields at Quetta.

## A. FEDTSCHENKOI (Mor.).

Two specimens from Quetta.

## CAMPTOPCEUM RUFIVENTRE (Mor.).

No species of this genus has hitherto been recorded from India. I obtained at Quetta some 20 specimens of both sexes of a bee of this genus; the ♂ agrees with the description of Morawitz's *C. rufiventre*, and the ♀ with that of his *C. schewyrewi*. All my specimens are undoubtedly one species, and thus the name of *rufiventre* must stand by the laws of priority. The specimens vary among themselves to some extent, especially as regards the amount of yellow on the thorax; the wings in the ♀ are darker than those of the ♂.

This species, having been described from Turkestan, and extending to Quetta, must be widely spread, but all the specimens which I obtained were caught at a particular kind of thistle in an area of about 100 square yards. I never came across either the bee or the thistle elsewhere. I mention this to show how easily a species, which frequents a special flower, may be overlooked, though spread over a large area.

## CERATINA INO, n. sp.

♀ Head, thorax and abdomen minutely aciculate, enclosed space at base of median segment finely rugose. Head and thorax dark metallic greenish black; mandibles, clypeus, a spot above it, the antennæ below, pronotum, scutellum, postscutellum, and the legs pale yellowish testaceous; antennæ above rufo-testaceous; abdomen pale yellow or pale testaceous, 1st (sometimes also 2nd and 3rd) abdominal segment with a narrow transverse subapical band black; pubescence greyish white, wings hyaline and iridescent, nervures very pale testaceous, tegulæ yellowish.

♂ Similar, more slender.

*Long.* 3 mm.

*Habitat*—Quetta ; Peshin ; common at tamarisk flowers.

Easily distinguished from any other species by the abdomen being almost entirely pale yellow or testaceous yellow.

CERATINA EGERIA, n. sp.

♀ Smooth and shining, the median segment finely rugose at base. Head and thorax black, with a greenish or blueish tinge, abdomen brownish black ; the apex of the anterior femora, the anterior tibiæ and tarsi, the intermediate tibiæ and the tarsi at base, the posterior tibiæ below and the tarsi pale yellow ; antennæ rufo-testaceous, lighter below, abdomen with a pale yellowish white transverse band at base of 2nd segment ; all the segments very narrowly testaceous at apex, abdomen below more or less testaceous ; wings clear hyaline and iridescent, nervures and tegulæ very pale testaceous, scarcely visible without a microscope.

♂ Similar, the clypeus pale yellowish white, the antennæ below, the apex of the femora, and the whole of the tibiæ and tarsi pale yellow ; the band at base of 2nd abdominal segment frequently obsolete.

*Long.* 3 mm.

*Habitat*—Quetta ; common at tamarisk flowers.

Nearest to *C. parvula* (Smith) from Albania, but may be distinguished by the abdomen not being punctured.

CERATINA CORINNA, n. sp.

♀ Clypeus sparsely and shallowly, head closely and somewhat coarsely, thorax more finely and less closely, abdomen closely and somewhat coarsely, punctured, the apical margins of the segments constricted and more finely punctured ; clypeus with the anterior margin transverse in the centre, rounded at the sides ; scutellum with its lateral margin compressed ; abdomen much longer than head and thorax united, the apical segment with a slight keel in the middle at apex ; all the ventral abdominal segments smooth at base, punctured in the middle and at apex, the punctures gradually increasing in size towards apex, 3rd segment with a transverse median furrow. Bronzy green, the clypeus and tubercles pale orange-yellow ; antennæ black or blackish ; labrum, a spot on each side of front near apex of clypeus, and the furrow on 3rd ventral segment black ; a line on the anterior tibiæ, the intermediate tibiæ at base and apex, the posterior tibiæ, and all the tarsi varying

from pale to dark testaceous; calcaria pale testaceous; pubescence grey and sparse, except on the posterior tibiæ and tarsi; wings sub-fuscous, lighter at base, median nervure pale testaceous, remaining nervures blackish, tegulæ testaceous with a yellow spot.

*Long.* 7—9 mm.

*Habitat*—Quetta; common.

This species may easily be distinguished from *C. viridissima* by its sub-fuscous wings. Of the European species it is nearest to *C. tibialis* (Mor.), but is without any carina on the penultimate abdominal segment.

#### CERATINA LÆVIFRONS (Mor.).

This species is common at Quetta.

#### ERIADES TENUIS, n. sp.

♀ Finely and very closely punctured, head and mesonotum almost granular, mandibles with a median longitudinal carina, not reaching the base; clypeus very convex, transverse at apex; 2nd joint of flagellum much shorter than the 1st, and about half its width; punctures at the sides of the mesonotum coarser and larger than in the middle; base of median segment depressed, the depressed portion narrow in the centre, where it is longitudinally striate, and wider at the sides, where it is obliquely rugose, remainder of segment smooth; all the tibiæ very large, apex of intermediate tibiæ on the outside produced, almost dentate; abdomen nearly as long as head and thorax united. Black, calcaria testaceous; pubescence grey, very sparse, and forming narrow bands on apical margins of abdominal segments 1—3; on the posterior tarsi the pubescence is rather long, and has a golden tinge; scopa greyish-white, sparse, wings sub-hyaline, nervures and tegulæ piceous.

*Long.* 6 mm.

*Habitat*—Mount Abu; two specimens.

This species is nearest to *Heriades parvula* (Bingh), from which it may be distinguished by the absence of an impressed line on the 2nd abdominal segment. In the spelling of the generic name I follow Friese.

#### CÆLIOXYS PERSEUS, n. sp.

♀ Head pubescent, hiding the sculpturing; thorax deeply, but not very closely, punctured, especially the scutellum, which is almost bare and shining; abdomen finely and sparsely punctured, apical segment

impunctate; head as broad as thorax, eyes very slightly converging below; scutellum with its posterior margin rounded and upturned, the lateral teeth short and blunt; median segment vertical; abdomen about half as long again as head and thorax united, conical, the apical segment long, tapering to a point, ventral plate slightly longer than the dorsal. Black; pubescence snow-white, thick on clypeus and front; on thorax, legs and abdomen formed of white scales, with two small spots at base of scutellum, and narrow interrupted bands on the margins of segments; on the inside of all the tarsi it is fulvous or golden; tarsi reddish-black, calcaria rufo-testaceous; wings hyaline, darker towards apex, nervures and tegulæ black.

♂ Similar, smaller, all the abdominal segments with minute lateral spines, penultimate segment with small blunt lateral teeth, apical segment with six teeth, all long and acute, two being lateral and the remainder apical, of which two are above and two below.

*Long.* ♀ 10 mm. ♂ 7-8 mm.

*Habitat*—Mount Abu; four specimens.

The present may be distinguished from any other Indian species by the posterior margin of the scutellum being turned upwards.

CROCISA ELEGANS (Mor.).

Fairly common at Quetta.

EUCERA MEDUSA, n. sp.

♀ Head and thorax closely, but not very finely, punctured, granular, abdomen closely and finely punctured, the punctures shallower towards the apices of the segments, the extreme apices impunctate, shining; clypeus sub-parallel, its anterior margin transverse; postscutellum raised and prominent; no triangular or semicircular space at base of median segment; abdomen as long as head and thorax united. Black; the margins of ventral abdominal segments and the apical 3 or 4 joints of all the tarsi rufo-testaceous, calcaria pale testaceous, antennæ reddish-black; pubescence on head greyish-white, clypeus bare; on thorax thick, somewhat short, ashy grey; on abdomen grey on basal segment, with thick bands of short depressed white hairs on apical margins of segments 3-5, and a trace of a similar band on apical margin of 2nd segment, the bands on 3rd and 4th segments very broad; apices of ventral segments sparsely ciliated with greyish hairs; pubescence on legs and scopa greyish, fulvous on the inside of all the tibiae; wings very short, sub-hyaline, nervures and tegulæ dark testaceous; only two cubital cells.

*Long.* 12 mm.

*Habitat*—Quetta; three specimens.

This genus is divided into two sub-genera by Friese (*Apidae Europæe*, viz., *Eucera*, with two cubital cells, and *Macrocera*, with three. The generic name *Macrocera* has the priority over *Tetralonia*. Several species of *Tetralonia* have been previously recorded from India, but I believe that true *Eucera*, with only two cubital cells, has not been previously obtained within Indian limits. The present species is nearest to *E. melaleuca* (Mor.) from *F. Turkestan*, which however has the scopa black.

EUCERA DIANA, n. sp.

♀ Head and thorax closely, but not very finely, punctured, granular, abdomen closely and finely punctured; clypeus sub-porrect, its anterior margin transverse; the sculpturing of the thorax hidden by the pubescence; abdomen scarcely as long as the head and thorax united. Black; the apical three or four joints of all the tarsi and the margins of ventral segments rufo-testaceous, calcaria pale testaceous; pubescence on head greyish, clypeus bare; on thorax and base of 1st abdominal segment long, greyish fulvous; abdomen with bands of white pubescence on apical margins of segments 1—5, that on 1st segment narrow and interrupted in the middle; legs and scopa with greyish fulvous pubescence, apical margins of ventral segments ciliated with fulvous, the tarsi inside with similarly coloured pubescence; wings sub-hyaline, nervures black, tegulæ testaceous; only two cubital cells.

*Long.* 12-13 mm.

*Habitat*—Kashmir, 5,000 ft.; two specimens.

This species is very near the last, but can be distinguished from it by the larger wings, black nervures, and narrower abdominal bands.

EUCERA MELANOSTOMA (Mor.).

One specimen from Quetta.

EUCERA (MACROCERA) PHRYNE, n. sp.

♀ Clypeus closely and regularly punctured, remainder of head and thorax with the sculpturing hidden by the pubescence; abdomen minutely and closely punctured. Black; the mandibles at base, and clypeus pale yellow; anterior margin of clypeus and labrum brownish testaceous; mandibles at apex and antennæ red, the basal three joints of the latter brownish black; calcaria and apical two or three joints of tarsi

rufu-testaceous ; 1st and 2nd ventral abdominal segments brownish testaceous ; clypeus bare ; colour of pubescence as follows—on labrum greyish fulvous, on front and cheeks white, on occiput pale fulvous, on thorax above thick rich fulvous, below and at the sides greyish to pale fulvous, at base of 1st abdominal segment pale greyish fulvous ; 1st segment at apex bare, 2nd and 3rd with basal bands narrowed or interrupted in the centre, 4th with broad entire apical band, all of snow-white short pubescence, 4th and 5th segments with short velvety black pubescence at base ; abdomen below with fuscous or black pubescence ; anterior and intermediate legs with greyish fulvous pubescence, except on the intermediate tarsi, where it is of black and grey hairs intermixed ; posterior tibiæ and tarsi with white pubescence above, black below ; wings sub-hyaline, nervures dark testaceous to black, tegulæ rufu-testaceous ; three cubital cells.

♂ Similar, the antennæ as long as the whole body, only the basal joint black or blackish brown ; the pubescence on the thorax is somewhat paler fulvous, 2nd to 5th segments with basal bands of snow-white pubescence, the bands somewhat narrowed in the middle : all the legs with grey pubescence above, below fulvous intermixed with black hairs.

*Long.* 11-12 mm.

*Habitat*—Deesa ; not uncommon.

Nearest to *Eucera (Tetralonia) punctata* (Cam.), but larger, and differs in the colour of the pubescence on the abdomen.

#### EUCERA (MACROCERA) POMONA, n. sp.

♀ Head, thorax, and abdomen with the sculpturing hidden by the pubescence ; abdomen shining through the pubescence ; anal rim very finely transversely striate. Black ; calcaria and all the claws at base rufu-testaceous ; abdomen below with all the segments more or less testaceous at the margins ; pubescence as follows—on clypeus and labrum short, thick, greyish white ; on front long, grey, with some black hairs along both margins of the eyes and on vertex ; on thorax above greyish, with a fulvous tinge, below grey ; on abdomen, 1st segment long, grey, sparse towards apical margin ; 2nd segment greyish, somewhat sparse, apex with a widely interrupted band of white hairs ; 3rd, 4th and 5th segments velvety black at base, with bands of snow-white hairs on apical margins, the bands thick, that on 3rd segment widely, on 4th segment narrowly interrupted in the middle,



that on 5th segment widely interrupted, but less widely than the band on the 5th segment; on 6th segment sparse and blackish, white laterally; ventral segments at apex ciliated with greyish, 4th and 5th segments with white hairs; on all the legs grey above, on anterior tibiæ below inclining to fulvous, on intermediate tibiæ below, and on posterior tibiæ and tarsi below black; wings hyaline, three cubital cells, the 1st recurrent nervure is received into the 2nd cubital cell near its outer angle; nervures and tegulæ black.

♂ More slenderly built; antennæ when thrown back not quite reaching the apex of abdomen. Black; the centre of the clypeus yellow, calcaria and base of claws rufo-testaceous, ventral segments obscurely testaceous at margins; pubescence as follows—on head similar to that of ♀, but on clypeus and labrum very long silky white, almost concealing the yellow of clypeus; on thorax and first two abdominal segments grey; on remaining segments black, with some long white hairs laterally; all the legs with greyish pubescence, intermixed with some black hairs.

*Long.* ♀ 14 mm. ♂ 12 mm.

*Habitat*—Quetta; extremely common at fruit tree blossoms in March. The males seem to largely outnumber the females.

This species is near to *Eucera vernalis* (Mor.). The ♀, however, can be distinguished by the white apical bands on the abdominal segments being interrupted, and the ♂ by the labrum being black and not yellow. I have a large number of specimens, and they seem remarkably constant in the colouring of the pubescence.

EUCERA (MACROCERA) CASSANDRA, n. sp.

♀ Clypeus closely and somewhat coarsely punctured, scutellum closely and finely, median segment somewhat rugosely, punctured, remainder of sculpturing of head and thorax hidden by the pubescence; abdomen with the bases of segments 1—4 closely and finely punctured, their apices depressed, and except the 1st segment, which is bare at apex, having broad apical bands of thick, short, greyish, depressed pubescence. Black; the mandibles at base, and clypeus, except its anterior margin, bright yellow; labrum and antennæ piceous or rufo-piceous, the former sometimes yellowish at base; anterior margin of clypeus, and apical joints of tarsi, more or less rufescent; apical margins of abdominal segments pale testaceous, but the colour, except in the 1st segment, hidden by the pubescent bands; calcaria pale; the lateral and apical

margins of ventral abdominal segments more or less testaceous ; pubescence griseous, snow-white, or nearly so, on front and on the sides of median segment ; basal and apical margins of abdominal segments 2—4 and the whole of segment 5 with short creamy-white pubescence, this being often abraded at the basal portion of the segments ; anal fimbria and pubescence on inside of posterior tarsi with an inclination to fulvous ; wings hyaline, nervures and tegulæ testaceous.

♂ Similar to the ♀ as regards the sculpturing ; labrum yellow, as well as the clypeus and base of the mandibles ; 3rd and following joints of flagellum of antennæ light-red below ; the testaceous margins of abdominal segments much narrower, and the bands, as well as the whole of the head and thorax, less pubescent ; pubescence on inside of posterior tarsi bright fulvous ; nervures inclining to red.

*Long.* ♀ 11-12 mm.; ♂ 9-10 mm. ♂ antennæ 7 mm.

*Habitat*—Quetta ; Peshin ; common in May.

The ♀ seems to be allied to *Eucera radoszowskii* (Mor.) The ♂ is perhaps nearest to the same sex of *E. spectabilis* (Mor.) and *orientalis* (Fries), but may be at once distinguished by the flagellum of antennæ being almost entirely light red below.

EUCERA (MACROCERA) SPECTABILIS (Mor.).

Common at Quetta.

EUCERA (MACROCERA) TURCESTANICA (Dalla Torr.).

I identify with some doubt some Quetta specimens as this species.

PODALIRIUS VEDETUS, n. sp.

♀ Clypeus and front closely and finely, labrum more coarsely and rugosely, punctured, mesonotum under the pubescence very finely and closely punctured, abdomen impunctate ; clypeus sub-parallel, its anterior margin transverse ; cheeks between lower margin of eyes and mandibles narrow but distinct ; antennæ with the 2nd joint of flagellum longer than the three following united. Black ; colour of pubescence as follows:—On head above grey, below white ; on thorax above fulvous, fulvous grey, or grey, below grey ; 1st abdominal segment with long greyish or fulvous pubescence, and a narrow ciliated band of lighter grey ; 2—4th segments with short black pubescence at base, sometimes intermixed with grey hairs, their apices ciliated with bands of greyish pubescence, which sometimes inclines to pale fulvous ; 5th segment in the centre black, with long white lateral hairs ; all the ventral segments

ciliated with greyish white hairs ; all the legs with grey pubescence, sometimes mixed with black hairs ; scopa white ; posterior tibiæ and tarsi black below ; all the calcaria black ; wings hyaline or sub-hyaline, nervures and tegulæ black.

♂ Labrum and clypeus anteriorly with shallow punctures, remainder of head and thorax apparently impunctate, the pubescence hiding the sculpturing ; abdomen finely aciculate, with a few fine punctures ; clypeus sub-porrect, very convex, its apex transverse in the middle, the sides rounded ; a short carina between the bases of antennæ. Black ; the labrum, except a narrow line all round and two semicircular spots at its basal angles, the clypeus, except two irregular quadrate spots at its base, an irregular mark on the front above the clypeus, extending a short way upwards along the inner orbits of the eyes, but not reaching as high as the base of the antennæ, and the scape of the latter yellow ; the tarsi, except their basal joint, more or less testaceous ; pubescence dense, on the head griseous, mixed with a few black hairs ; on the thorax and first two abdominal segments it varies from griseous to pale fulvous ; on the 3rd and following segments it is black, the margins of segments being more or less fringed with long griseous hairs, pygidium sub-triangular, with stiff fulvous hairs ; legs with long pubescence, griseous intermixed with black, the inside of anterior tarsi with short fulvous pubescence ; metatarsi of intermediate legs with a very large tuft of black pubescence, the longer hairs white at the tips, tibial calcaria pale ; wings hyaline, nervures dark testaceous, almost black, tegulæ black.

Long. ♀ 12-15 mm. ♂ 12-13 mm.

Habitat—Kashmir, 5,000 ft. ; Quetta ; Peshin ; common in March and April.

The ♂ is very like the same sex of *P. sichelii* (Rad.), but the ♀ bears no resemblance to that species.

#### PODALIRIUS CONNEXUS, n. sp.

♀ The sculpturing almost entirely hidden by the pubescence ; clypeus finely rugose, mesonotum finely punctured, abdomen minutely and closely punctured ; clypeus large, sub-porrect, with a median longitudinal carina not reaching its apex, its anterior margin arched ; antennæ with the 2nd joint of the flagellum equal in length to the following four united. Black ; the claws at base rufous, apical joints of tarsi rufo-piceous, calcaria piceous ; pubescence grey above, with a slightly fulvous tinge on the 1st abdominal segment, on front and below lighter grey ; on the

vertex and along the inner orbits of the eyes are black hairs intermixed with the grey; the 2nd, 3rd and 4th abdominal segments are strongly fringed at apex with white or whitish pubescence, 5th segment with black, fringed laterally with whitish pubescence; on the anterior legs the pubescence is somewhat sparse and fuscous grey; on the intermediate and posterior tibiae and tarsi it is bright fulvous outside, black inside; wings hyaline, nervures and tegulae piceous.

♂ Second joint of flagellum equal to next three united. Black; clypeus rather pale yellow, claws and apical tarsal joints more or less rufo-testaceous, calcaria piceous; pubescence grey above, blackish on apical two abdominal segments, below whitish, very long and silky; clypeus and front with very long silky white pubescence, fringed with black hairs on vertex and along inner orbits; legs with long grey pubescence, apical joint of intermediate tarsi with a very slight tuft of black hairs, many of the spines on the tarsi rufous or rufescent; wings hyaline, nervures and tegulae piceous.

*Long.* 12-13 mm.

*Habitat*—Quetta; not uncommon at fruit tree blossoms in the early spring.

The ♀ is nearest to *P. testaceipes* (Mor.) and *P. chrysoenemis* (Mor.).

From the former it can be distinguished by the pubescence on the inside of the posterior tibiae and tarsi being black; from the latter by the pubescence on the thorax being greyish and not yellow.

The ♂ is nearest to *P. ventilabris* (Leq.) from Algeria, but can be distinguished by the pubescence on the thorax being grey and not rufous.

#### PODALIRIUS SERGIUS, n. sp.

♀ Differs from the same sex of *P. connexus* above in being constantly smaller, and in the pubescence on intermediate and posterior tarsi being grey and not fulvous.

♂ Differs from the same sex of *P. connexus* in being smaller, and in having the labrum, scape in front, and a small mark on the inner orbits of the eyes yellow.

*Long.* 11-12 mm.

*Habitat*—Quetta; common in the spring; it appears somewhat later than *P. connexus*.

I took ♀ and ♂ of this species in coitu. Both sexes of this species are allied to *P. uljaninii* (Fodt.); the ♀ however differs from the same

sex of that species in having the scopa grey and not fulvous. The ♂ I identified as *P. uljaninii* until I got a specimen in coitu with the ♀ as above described; the only difference which I can detect between them is that the tuft on the apical joint of the intermediate tarsi is much smaller in the present species than in *P. uljaninii*, in fact it is scarcely noticeable as a tuft.

The genus *Podalirius* is common at Quetta, and I obtained the following species not previously recorded from India:—

*P. picicornis* (Fedt.).

*P. albigenus* (Lep.).

*P. orientalis* (Mor.).

*P. fulvitarsis* (Brullé); one specimen.

*P. atricillus* (Everimann); one specimen.

*P. velocissimus* (Fedt.); common.

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